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Travolution of Embedded System in Passenger Car of Road Safety

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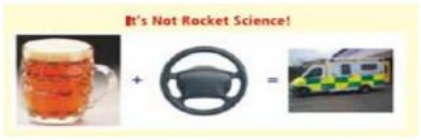
Abstract:
Security in travel is primary concern for everyone. This Project describes a design of effective alarm system that can monitor an automotive / vehicle / car condition in traveling. This project is designed to inform about an accident that is occurred to a vehicle to the family members of the traveling persons.

Introduction:
World Health Organization's , first ever Global Status Report on Road Safety reveals that 90% of deaths on the world's roads occur in low and middle income countries (21.5 and 19.5 per lakh of population, respectively) though they have just 48% of all registered vehicles. India has the second largest road network in the world with over 3 million km of roads of which 60% are paved. These roads make a vital contribution to the India's economy. According to a government report, road accidents in India killed 1,34,000 people in 2010 (an average of 336 a day). Accidents due to drunken driving are a major problem in India.

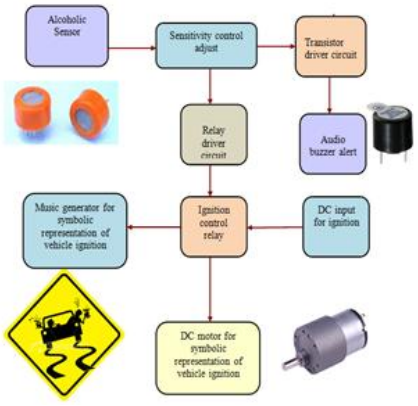
The problem is unrecognized and hidden due to lack of good quality research data. A study conducted by Alcohol & drug Information Centre (AIDC), India revealed that around 40% of the road accidents have occurred under the influence of alcohol. Young male drivers are at a high risk of such accidents. Though some efforts are being taken to reduce the Road Accidents due to drunken driving, considering the gravity of the situation it is important to change strategies and mechanisms with foresight and effective implementation.

Alcohol is a depressant drug that Slows down the activity of the brain Contains absolutely no nutrients Does not help to relieve tension, induce sleep or solve problems.



DRINKING AND DRIVING –DON'T GO TOGETHER

Literature Review:
Existing System:
In our alcohol detection system the ignition of the fuel is regulated by a sensor circuit. The sensor circuit is used to detect whether alcohol was consumed by the driver recently. Our design also consists of sensor which is used to check whether alcohol is consumed while driving. The effects of drinking and driving are always risky and can often be lethal. In this project we are going to detect the amount of alcohol taken by the person. When the amount of the alcohol is reached to a threshold limit (Dangerous/maximum) it automatically turns off the combustion engine of the vehicle with buzzer indication and simultaneously with a LED indication.



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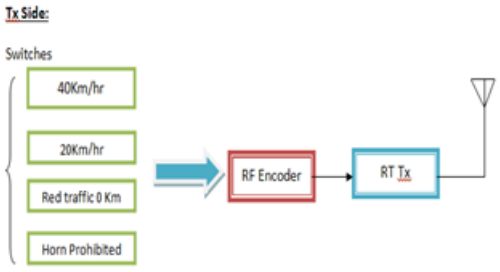
Drawback:

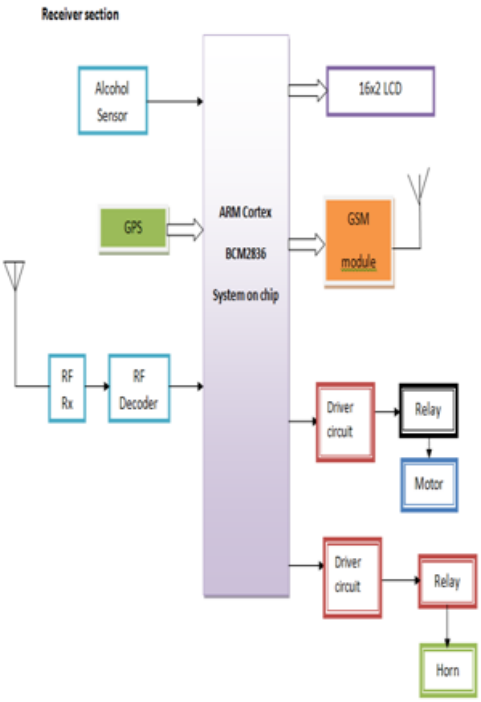
There is no remote alert system to track the vehicle.

Proposed System:

This Project presents an automatic vehicle accident detection system using GPS and GSM modems. The system can be interconnected with the Alcohol detection, and alert the owner on his mobile phone. This detection and messaging system is composed of a GPS receiver, Microcontroller and a GSM Modem. GPS Receiver gets the location information from satellites in the form of latitude and longitude. Alcohol sensor is provided to know whether the driver is alcoholic or not. The red traffic light zone, over speed detection in restricted areas, horn prohibited areas will be provided by RF transmitter.

The vehicle security is enhanced as all the features are embedded in it. The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation . The Raspberry Pi has a Broadcom BCM2836 system on a chip which includes a processor. It does not include a built-in hard disk or solid-state drive, but Uses an SD card for booting and long-term storage. This project uses regulated 5V, 750mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.





RASPBERRY-PI:

The Raspberry Pi has a Broadcom system on a chip (SoC).

Features:

- System Memory – 1GB LPDDR2
- Storage – micro SD card slot (push release type)
- Video & Audio Output – HDMI and AV via 3.5mm jack.
- Connectivity – 10/100M Ethernet
- USB – 4x USB 2.0 ports, 1x micro USB for power
- Expansion
  2×20 pin header for GPIOs
  Camera header

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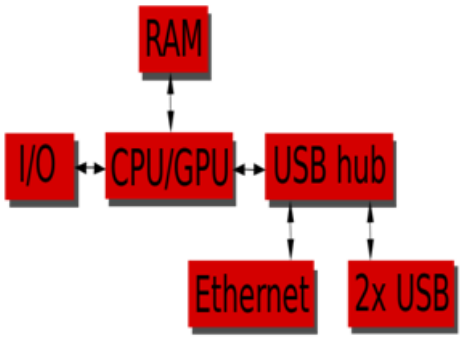
Display header

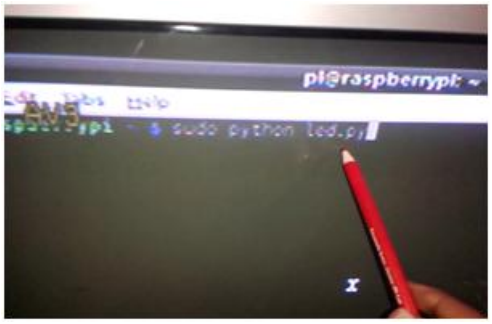
- Power – 5V via micro USB port.
- Dimensions – 85 x 56 mm

Basic Hardware of Raspberry-PI:



OS used in Raspberry pi is Linux

Coding will be done in python/C language



Global System for Mobile Communication:

GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area.

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication.

Basic concept of GPS:

A GPS receiver calculates its position by precisely timing the signals sent by the GPS satellites high above the Earth. Each satellite continually transmits messages which include.

- the time the message was transmitted
- precise orbital information (the ephemeris)
- The general system health and rough orbits of all GPS satellites (the almanac).

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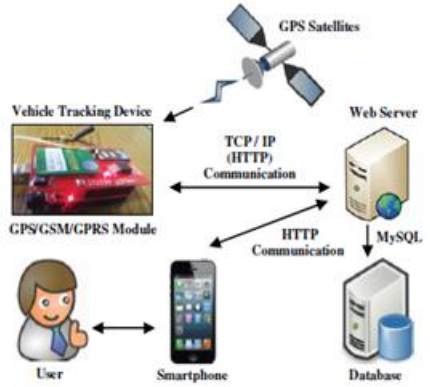

Alcohol Gas Sensor - MQ-3:

Description:

This alcohol sensor is suitable for detecting alcohol concentration on your breath, just like your common breathalyzer. It has a high sensitivity and fast response time. Sensor provides an analog resistive output based on alcohol concentration. The drive circuit is very simple, all it needs is one resistor. A simple interface could be a 0-3.3V ADC.

Features:

- 5V DC or AC circuit
- Requires heater voltage
- Operation Temperature: -10 to 70 degrees

Advantages:

- Sophisticated security
- Monitors all hazards and threats
- Alert message to mobile phone for remote information
- Mobile number can be changed at any time

Applications:

- Automotive and transport vehicles
- Security, Remote monitoring, Transportation and logistics

Future Scope:

Air bag can be introduced

Conclusion:

Here We Have Designed and implemented Travolution — An embedded system in passenger car for road safety using Raspberry pi.

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Bibliography:

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